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UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF CALIFORNIA
SAN JOSE DIVISION

Quanergy Systems, Inc.

Plaintiff and Counterclaim
Defendant,

v.

Velodyne LiDAR, Inc.

Defendant and Counterclaim
Plaintiff.

Case No. 5:16-cv-05251-EJD

**PLAINTIFF QUANERGY SYSTEMS, INC.'S
RESPONSIVE CLAIM CONSTRUCTION
BRIEF**

Judge: Hon. Edward J. Davila

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I. INTRODUCTION

In an attempt to salvage its claims in the face of prior art and still have its claims read on Quanergy's product, Velodyne takes a hybrid approach to claim construction. It attempts to narrow the claims by arguing, for the first time since it filed its patent application, that its preamble has any meaning at all, while at the same time trying to broaden the body of the claim by suggesting that nonce words have some vast understood meaning in the industry. Velodyne attempts to broaden certain claim terms to cover concepts never contemplated by the inventors, without regard to well established principles of claim construction and contrary to the meaning understood by a person of skill in the art ("POSITA"). Quanergy respectfully submits this responsive claim construction brief and asks the court to adopt its proposed constructions, which are consistent with the specification and strongly supported by the evidence.

II. TECHNOLOGY AT ISSUE

Quanergy is the leader in automotive and industrial grade 3D time-of-flight LiDAR sensors. Quanergy develops smart sensing solutions for real-time 3D mapping and object detection, tracking, and classification. Quanergy's products can be used in various markets for 3D LiDAR sensors and LiDAR-based sensing systems including passenger vehicles, security, surveillance, logistics and a variety of other applications. In the automotive space, Quanergy's LiDAR sensors enable broad deployment of advanced driver assistance systems and autonomous driving systems.

Velodyne's U.S. Patent No. 7,969,558 (the "'558 Patent" or "'558") is directed to scanning systems. Scanning is a technique that allows a sensor, with a field of view smaller than the region of interest, to obtain data across the entire region of interest. Kamerman Decl. ¶ 19. A common example is an eye scanning across a line of text. Scanning can be employed in conjunction with many types of sensors, including LiDAR (Light Detection and Ranging) sensors. A LiDAR sensor transmits a pulse of light, detects the reflected pulse, and measures the time elapsed between transmission and detection to determine the distance the light travelled before it was reflected (i.e. the distance between the sensor and the object that reflected the light).¹ See Ex. 1, Glennie Tr. at 115:3-9. A LiDAR scanning sensor may use a laser as its light source, in which case it may be

¹ Radar (Radio Detection and Ranging) applies the same general principle with radio waves.

referred to as a “laser scanner.” *Id.*; *see also* Kamerman Decl. ¶ 20. Designing and building a laser scanning system requires specifying many elements including the frequency of the laser (Ex. 1, Glennie Tr. at 49:6-20), whether a waveform signal should be digitized or not (*id.*, 49:21-25), where lasers will be placed (*id.* at 53:5-11), how far lasers should be able to range, beam divergences, and how scan patterns are shaped (*id.* at 50:1-5). *See generally* Kamerman Decl. ¶¶ 21-25.

The claims of the ’558 Patent are directed to a system that scans quickly – with a speed of at least 200 RPM (revolutions per minute), which allows the system to rapidly collect data. While the patent discloses using this system to collect ranging data, it may also be used for other purposes, such as 2-D intensity imaging. *See* Ex. 1, Glennie Tr. at 129:19-23, *see also* Kamerman Decl. ¶ 169.

III. DISPUTED TERMS

A. The Preamble Is Not Limiting, “A lidar-based 3-D point cloud system comprising” (claim 1) / “A method of generating a 3-D point cloud comprising” (claim 19) (Terms 1 & 3)

As the Federal Circuit observed, “Generally, the preamble does not limit the claims.” *Allen Eng’g Corp. v. Bartell Indus., Inc.*, 299 F.3d 1336, 1346 (Fed. Cir. 2002)². As in the claims of the ’558 patent, “a preamble is not limiting where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use of the invention.” *Catalina Marketing Int’l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002). Moreover, “[a] preamble is not regarded as limiting ... when the claim body describes a structurally complete invention such that deletion of the preamble phrase does not affect the structure or steps of the claim invention.” *Am. Med. Sys., Inc. v. Biolitec, Inc.*, 618 F.3d 1354, 1358-59 (Fed. Cir. 2010) (quoting *Catalina Marketing*, 289 F.3d at 809).

Applying these principles, the preambles of claims 1 and 19 are not limiting. Despite never arguing during prosecution that its claims should be limited by the preamble, Velodyne now argues that the preamble of claims 1 and 19 are somehow limiting. Velodyne’s attempt to now limit its claims to a preferred embodiment to avoid a certain invalidity challenge should be rejected. DI 68 at 4-7. The preamble of claims 1 and 19 does not recite essential structure or steps and is not necessary

² This Court is familiar with the general law of claim construction, thus, Quanergy will cite relevant case law as necessary to construe the claim terms at issue.

1 to give life, meaning and vitality to the claims. Without the preamble, the body of each of claims 1
2 and 19 recites a structurally complete invention.

3 **1. The Structural Components in the body of the claims define a complete**
4 **invention.**

5 The bodies of claims 1 and 19 each describe a structurally complete invention. Each of these
6 claims requires: (1) “a support structure;” (2) “a plurality of laser emitters supported by the support
7 structure;” (3) “a plurality of avalanche photodiode detectors supported by the support structure;”
8 and (4) “a rotary component configured to rotate the plurality of laser emitters and the plurality of
9 avalanche photodiode detectors at a speed of at least 200 RPM” (collectively, Structural
10 Components). ’558 Patent, claims 1, 19. A POSITA³ would understand that the Structural
11 Components define a complete invention. Kamerman Decl. ¶ 154. In fact, the Structural
12 Components could be used for purposes other than the purpose described in the preamble.

13 Using the Structural Components in claim 1 as a detection and ranging device or to generate
14 a 3D point cloud are merely intended uses. “[P]reambles describing the use of an invention
15 generally do not limit the claims because the patentability of apparatus or composition claims
16 depends on the claimed structure, not on the use or purpose of that structure.” *Catalina Marketing*,
17 289 F.3d at 809 (citing *In re Gardiner*, 171 F.2d 313, 315-316 (C.C.P.A. 1948)). The preamble to
18 claim 1 recites two elements – that the system is a “lidar-based ... system” and that it is a “3-D point
19 cloud system.” The claim 19 preamble simply includes “A method of generating a 3-D point cloud”.

20 A “LiDAR-based ... system” is merely an intended use. As previously explained, “LiDAR”
21 means using a light detection and ranging devices. When the Structural Components are used as a
22 ranging device, the term LiDAR in the preamble merely gives a name to the claimed structure,
23 which does not make the term a limitation. *Am. Med. Sys.*, 618 F.3d at 1359 (preamble phrase does
24 not limit claim scope where it merely provides a descriptive name for the invention set forth in the
25 bodies of the claims); *IMS Tech., Inc. v. Haas Automation, Inc.*, 206 F.3d 1422, 1434 (Fed. Cir.

26 _____
27 ³ Defined by Mr. Kamerman as “a person with at least a Bachelor of Science degree in Electrical
28 Engineering, plus a minimum of four (4) years of experience working in the field of lidar or
scanning sensor hardware design with additional training or direct experience in laser safety. A
POSITA would also include someone with equivalent experience.” Kamerman Decl. ¶ 18.

2000) (preamble phrase "control apparatus" does not limit claim scope where it merely gives a name to the structurally complete invention).

Similarly, generating a "3D point cloud," as recited in the preamble merely recites an intended use of the data collected from the claimed detectors. The Structural Components, even when used as a LIDAR device, can be used, for example, to generate a set of 2D points. '558, 1:45-47; Ex. 1, Glennie Tr. at 122:14-123:17.) While the data collected from the claimed detectors could be used to generate a 3D point cloud, this is not required of the claim and does not convert it into a claim limitation. *See TomTom, Inc. v. Adolph*, 790 F.3d 1315, 1324 (Fed. Cir. 2015) ("Though the collected data could at some point be used in the context of a navigation system, this is not required of claim 1, and does not convert it into a claim limitation"). Thus, it is merely an intended use of the claimed devices and method to generate a 3D point cloud.

Indeed, the undisputed fact is that the Structural Components in claim 1 could be used for purposes other than as a ranging (i.e., LiDAR) device. Kamerman Decl. ¶ 169; Ex. 1, Glennie Tr. at 129:19-23. Similarly, the steps in claim 19 could be used for purposes other than as a LiDAR system to generate a 3D point cloud. For example, both experts agreed that the structures recited in the body of claim 1 could be used to create a system for collecting panoramic, 2D images under conditions of limited visibility (*e.g.*, at night). *Id.* The Structural Components could be used in many configurations to include use in industrial applications and intrusion detection. Kamerman Decl. ¶¶ 171-174. Finally, Velodyne's experts' own interpretation of the preamble shows that it merely recites "us[ing] a LiDAR system to produce a 3D point cloud."

Q: You testified earlier that [the] RIEGL [prior art] provided a LiDAR-based 3D point cloud system, right?

A: They use a LiDAR system to produce a 3D point cloud, yes.

Ex. 1, Glennie Tr. at 150:10-13. Dr. Glennie acknowledged that a LiDAR system can be *used* to produce a 3D point cloud. Thus, the preamble describes an intended use of the claimed structure.

The language of the claims also support the construction that the preamble is not limiting. The preamble does not provide an antecedent basis for the terms in claims 1 and 19, nor any dependent claims. *Id.* In fact, the terms in the preambles of claims 1 and 19 never even appear in

any claim that depends from claims 1 and 19, respectively. Rather, the dependent claims provide the additional limitations required by a POSITA to limit the structure to particular applications. Kamerman Decl. ¶ 170.

As such, the preamble does not limit the claim. *See, e.g., Howmedica Osteonics Corp., v. Zimmer, Inc.*, 640 F. App'x 951, 956 (Fed. Cir. 2016) (holding a preamble was not limiting where the “body of each claim describes a structurally complete invention ... and deletion of the preamble language does not affect that structure.”)

2. The preamble was not used to distinguish prior art during prosecution.

When the claim body defines a structurally complete invention, the preamble does not limit the claim unless the patentee clearly relied on the preamble during prosecution to distinguish the claimed invention from the prior art. *See Catalina Marketing*, 289 F.3d at 808–09; *see also PersonalWeb Tech. LLC v. Int'l Bus. Machines Corp.*, No. 16-cv-01266-EJD, 2017 WL 2180980, at *12 (N.D. Cal. May 18, 2017) (quoting and applying *Catalina Marketing*); *compare*. Velodyne did not clearly rely on the preamble during prosecution, either in the amendments themselves or in arguing for the patentability of the claims.

First, Velodyne's amendments to the claims during prosecution reveal that it did not rely on the preambles to distinguish the claimed invention. Specifically, during prosecution, the Patent Office rejected the claims over Riegl in view of the Doemens. Ex. 2, 9/2/2010 Office Action at 2. Velodyne responded by canceling the pending claims and substituting new claims. Tellingly, the rejected claims and the modified claims contained the *same* preamble. *Id.* at 6, 8 (compare canceled claim 11 with new claim 25). The patent examiner then withdrew the rejection. *See* Ex. 3, 1/31/2011 Office Action Response. In fact, Dr. Glennie admitted that Riegl discloses “a LiDAR-based 3-D point cloud system,” just as recited in the preamble! Ex. 1, Glennie Tr. at 143:13-15. Thus, Velodyne could not rely on the preamble to distinguish the prior art.

Second, rather than relying on the preamble to distinguish the claims, Velodyne relied on the Structural Components to distinguish the prior art, adding new claims reciting “avalanche photodiode detectors” in place of “photon detectors”, and further reciting a rotary component configured to rotate at a speed of at least 200 RPM. *See* Ex. 3, 1/31/2011 Office Action Response.

1 Indeed, Velodyne placed these new limitations *in the body of the claims*. And Velodyne told the
 2 Patent Office that these Structural Components distinguished the claims from the prior art. In fact,
 3 in its Office Action Response, under the heading “New Claims 25-49⁴ are allowable,” Velodyne not
 4 only underscored the importance of these Structural Components, Velodyne’s arguments ignore the
 5 preamble altogether:

6 Claim 25 [which became ‘558 patent claim 1] requires support
 7 structure, a plurality of laser emitters supported by the support
 8 structure, a plurality of avalanche photodiode detectors supported by
 9 the support structure, and a rotary component configured to rotate the
 10 plurality of laser emitters and the plurality of avalanche photodiode
 detectors at a speed of at least 200 RPM. These aspects are not taught
 or suggested by the cited references. *A key point of distinction is the
 200 RPM rotation speed for the APD detectors and laser emitters.*

11 Ex. 3, 1/31/2011 Office Action Resp. at 16. To be sure, the preamble was not a “key point of
 12 distinction” during prosecution and is still not one today. Rather, Velodyne told the PTO that the
 13 “key point of distinction” is a 200 RPM rotation rate for the APDs and laser emitters.

14 And if doubt remains, just look at what Dr. Glennie told the patent office during prosecution.
 15 In a sworn declaration, Dr. Glennie characterized and distinguished the claimed system based on the
 16 Structural Components, without reference to the preamble. Ex. 4, Glennie Prosecution Decl. ¶ 7
 17 (“The Velodyne solution with many lasers and APDs, combined with a high spin rate, is unique.”).

18 Velodyne’s suggestion to the Court that it relied on the preamble to distinguish the prior art is
 19 contradicted in spades by (i) Velodyne’s claim amendments, (ii) Velodyne’s prosecution arguments,
 20 (iii) Dr. Glennie’s prosecution declaration, and (iv) Dr. Glennie’s deposition testimony. In sum, the
 21 prosecution history does not provide any basis to suggest the preamble limits the invention.

22 3. Velodyne’s arguments do not rebut the conclusion that the preamble is 23 limiting.

24 Velodyne does not dispute the Structural Components are a structurally complete invention.
 25 Nevertheless, Velodyne offers several arguments, none of which compel a different conclusion.

26
 27 ⁴ The pending claims in the January 31, 2011 Office Action Response were numbered 25-49. These
 28 claims were renumbered to 1-25 when the patent issued, that is, pending Claim 25 became issued
 Claim 1, etc.

1 **First**, Velodyne argues that the preambles are necessary to understand the “subject matter
2 and structural context of the claim,” and specifically, to understand that the laser emitters and APDs
3 must be linked together to create an “operative” device.⁵ DI 68 at 5; Ex. 1, Glennie Tr. at 124:18-22
4 (testifying that the Structural Components are missing structure teaching that the claimed emitter and
5 detector are “used together”). In fact, both parties’ experts agree that the Structural Components can
6 be used for purposes other than for a lidar-based 3D point cloud device. Ex. 1, Glennie Tr. at
7 129:19-23; Kamerman Decl. ¶ 169. Thus, the claim elements form an operable device even if not
8 operated as a lidar, and the laser emitters and APDs need not be linked to create an operable device.

9 Moreover, merely including the word “lidar” does not provide any additional structure to the
10 claim. For example, a specific structural “linking” of the emitters and detectors is recited in
11 dependent claim 3 (“wherein each one of the plurality of laser emitters is paired with a separate one
12 of the plurality of photon detectors in a fixed position to form a plurality of pairs of laser emitters
13 and avalanche photodiode detectors”). Claim 3 depends from claim 1. Thus, no such link is
14 required in claim 1. The components can be used in many configurations determined by the
15 numbers of emitters and detectors used; their angles; whether multiple emitters share a detector and
16 vice versa; power levels, whether the detector measures light intensity or width of pulses, etc. *See*,
17 *e.g.*, ’558, 4:2-5, 4:59-5:4; Ex. 1, Glennie Tr. at 49:6-20, 53:5-11, 50:1-5; Kamerman Decl. ¶ 102.

18 **Second**, Velodyne argues that the preambles must be limiting because a “LiDAR device that
19 generates a 3-D point cloud” is the “inventive concept” or “essence of the invention.” DI 68 at 5-6.
20 Velodyne relies on various citations from the specification for this argument. (relying on *Proveris*
21 *Sci. Corp. v. Innovasystems Inc.*, 739 F.3d 1367 (Fed. Cir. 2014) (holding that a preamble that
22 provided antecedent basis for the claim was limiting where it also recited the inventive concept of
23 the invention).) Even if intrinsic evidence exists suggesting that the preamble could limit the claim,
24 the preamble does not limit the claim if other intrinsic evidence makes it clear that this was not the
25 inventive concept or essence of the invention. Here, intrinsic evidence from the prosecution history
26 makes it clear that the inventive concept was (1) using a plurality of laser emitters and avalanche

27 _____
28 ⁵ Velodyne cites no case for the proposition that a claim that otherwise cites a structurally complete
invention requires additional language to provide it with “structural context.”

1 photodiode detectors, and (2) rotating at faster than 200 RPM. *See, e.g., SUMMIT 6, LLC v.*
 2 *Samsung Electronics Co.*, 802 F. 3d 1283, 1292 (Fed. Cir. 2015) (Samsung argued that the preamble
 3 is limiting “because it provides context essential to understanding the corresponding steps in the
 4 body of the claim because it is the only part of the claim that refers to the advance over the prior art,”
 5 and the Court disagreed, holding that the preamble was not limiting as it did not provide antecedent
 6 basis, there was no clear reliance during the prosecution, and the preamble was duplicative of the
 7 limitations in the body of the claim and merely provided context for the limitations.)

8 Velodyne’s effort to focus the “essence of the invention” into the preamble, renders the claim
 9 bodies meaningless, particularly when read in the light of Velodyne’s construction of 3D point
 10 cloud, as discussed below. Velodyne would read so many requirements into the claim that are
 11 nowhere in the claim body, that most of the requirement for the claim would be in the preamble.

12 **4. If a construction is necessary the Court should choose Quanergy’s simple**
 13 **construction that correctly construes the meaning to a POSITA, while**
 14 **Velodyne improperly imports numerous limitations into the claim**

15 Quanergy believes no construction is necessary because the preamble is not limiting. To the
 16 extent the court finds it necessary to construe the preamble terms, Quanergy proposes the
 17 construction “a collection of points in a 3-dimensional coordinate space” – the plain and ordinary
 18 meaning to a POSITA. Kamerman Decl. ¶¶ 176-178.

19 Velodyne doesn’t just want to improperly construe the preamble as limiting, it wants to read
 20 in a complex definition of “3-D point cloud” which is not only nonsensical, but unhelpful to the trier
 21 of fact because it is riddled with subjective terms, inconsistent with the plain and ordinary meaning
 22 of the term “3D point cloud.” Kamerman Decl. ¶¶ 179-193.

23 For example, Velodyne’s construction requires “distance measurements ... emitted and
 24 captured in rapid succession” But distance measurements are not *emitted* nor *captured*. As Mr.
 25 Kamerman explains, the language in the specification could not have been intended to provide a
 26 definition of 3D point cloud, as it uses sloppy terminology, and is contrary to the meaning to a
 27 POSITA. Kamerman Decl. ¶¶ 179-180, 183 (referring to Velodyne’s reliance on ’558 Patent, 1:19-
 28 31). Velodyne would also construe a 3-D point cloud to require collection in “rapid succession.”
 Yet Dr. Glennie testified that a 3-D point cloud can be collected over a period as long as half an

hour! Ex. 1, Glennie Tr. at 112:17-23; *see also* Kamerman Decl. ¶¶ 185-186 (citing example in the specification collecting a 3D point cloud over several minutes). At least in view of Dr. Glennie’s testimony, it is unclear how fast “rapid succession” must be. In other words, it is unclear where the boundary of the claim falls. Velodyne’s construction also requires creating a 3D point cloud by taking measurements “along sequentially varied directions.” The specification and Velodyne’s own web site, however, explain that sequentially varying the direction is not generally required to generate a 3D point cloud if a LiDAR known as a flash-LiDAR is used. Kamerman Decl. ¶ 184.

Velodyne also incorrectly alleges that its construction is taken directly from the specification. Nowhere does the specification state that a 3D point cloud must be able to “be rendered as a *three-dimensional* image,” only that a software program can *manipulate* the data to give the appearance of a 3-D image. ’558 Patent, 1:25-27. In addition, neither Velodyne, nor Dr. Glennie provide insight regarding how to render a collection of three dimensional points as a three dimensional image, or what is required to collect a set of three dimensional points that can be rendered as a 3-D image. As Mr. Kamerman explains, to a POSTIA, the claims in light of the specification and file history, do not require the claimed rotating scanner to collect information at a certain pace, or require any density of point cloud, that might be required to be able to render an image, or be able to detect obstacles. Kamerman Decl. ¶¶ 190-192 (noting that even in an autonomous vehicle application, the claimed structure will not always generate a sufficiently dense point cloud). It is also unclear what “other reasons” might be, beyond the single example of detecting obstacles, and whether any collection of three dimensional points could not be analyzed for at least some reason.

Velodyne’s only argument is that the plain and ordinary meaning cannot be correct, because it may encompass a situation in which there are only 2D points in a 3-dimensional space. DI 68 at 12. But the very definition of 2D points is that they only have 2 coordinates, and thus are not in a 3-dimensional coordinate space. A 2-dimensional point would have to have a third coordinate added to it to become a 3-dimensional point, at which point it could be in a 3-dimensional space.

Velodyne’s construction obfuscates the scope of the claims by importing subjective terms offering no clear delineations, is contrary to the understanding of a POSITA, and should be rejected.

B. The Rotary Component Limitations (Claims 1 & 19) / (Claim 8) (Term 2)

The parties agree that this term should be construed as means-plus-function element under 35 U.S.C. § 112 ¶ 6 (pre-AIA).

1. The claimed functions for the rotary component limitations require full and less than 360 degree rotation

Claims 1 and 19 recite “a rotary component configured to rotate ... at a speed of at least 200 RPM,” thereby specifying a rotation rate, but not the degree of rotation. Claim 8, dependent upon claim 1, provides the answer. It specifies “wherein the rotary component is configured to rotate the support structure through a full 360 degree rotation at the rotation speed of at least 200 RPM.” By including the phrase “through a full 360 degree rotation” in claim 8, and not in claim 1, necessarily requires that claim 1 is not limited to full 360 degree rotation. *See Karlin Tech. Inc. v. Surgical Dynamics, Inc.*, 177 F.3d 968, 971-72 (Fed. Cir. 1999) (The doctrine of claim differentiation is “based on the common sense notion that different words or phrases used in separate claims are presumed to indicate that the claims have different meanings and scope.”) Claim 8, by definition as a dependent claim, must be narrower than claim 1.

The parties agree that the function recited in claim 8 is “rotating the support structure through a full 360 degree rotation at the rotation speed of at least 200 RPM.” The function recited in claim 1 must then encompass rotation less than a full 360-degree rotation. Consistent with that, Quanergy’s proposed construction for claims 1 and 19 provides a broader scope to claim 1 than claim 8—it allows claim 1 to cover rotating for a full 360 degree rotation and also rotating for less than 360 degrees, whereas claim 8 provides rotation for a full 360 degrees. Kamerman Decl. ¶¶ 31-32. Scanning sensors employing back-and-forth, i.e., oscillating, movement to scan a region of interest were known in the art at the time of the filing of the ’558 patent, and are known to both Quanergy’s expert and Velodyne’s expert. Kamerman Decl. ¶ 32; Ex. 1, Glennie Tr. at 162:25-163:14. To limit claim 1 to only full 360 degree rotation, which is the effect of Velodyne’s proposed function, would inappropriately cause claims 1 and 8 to have the same scope. Moreover, Velodyne admits that claim 8 is “directed to the amount of rotation (‘through a full 360 degrees’).” DI 68, at 10. Thus,

1 Quanergy's construction merely states the corollary: that because claim 8 requires a full 360 degrees,
2 claim 1 permits both full 360 degree and less than 360 degree rotation.

3 Velodyne's arguments to the contrary are unavailing. First, Velodyne argues that Quanergy's
4 proposed function is different from the claimed function. DI 68, at 8. But Quanergy's proposed
5 construction does not add limitations, it merely specifies the full scope of the claim limitation—that
6 the device may rotate for 360 degrees or less. None of Velodyne's cited cases are to the contrary.
7 Rather, Velodyne egregiously misquotes Quanergy's expert's testimony, who consistently opined
8 that claims 1 and 19 "require rotating through a full 360 degrees" or "back and forth for less than
9 360 degrees." Ex. 5, Kamerman Tr. 168:21-169:13, 170:2-22; Kamerman Decl. ¶¶ 31-33.

10 Second, Velodyne incorrectly argues that claim differentiation is inapplicable. Claim 8, so
11 says Velodyne, narrows claim 1 even if claim 1 were not required to provide for rotation of 360
12 degrees or less than 360 degrees. Presumably, Velodyne is pointing to the language in claim 8
13 reciting that the "rotary component is configured to rotate the *support structure* ...," as opposed to
14 claim 1, which requires rotation of the laser emitters and avalanche photodiode detectors. '558
15 patent, cl. 1, 8. Claim 1, however, requires that the emitters and detectors are supported by the same
16 support structure, and every embodiment in the specification provides that support by mechanically
17 attaching the emitters and detectors to the support structure. Thus, all of the disclosed embodiments
18 require the emitters and detectors to rotate together. Velodyne admits as much. DI 68, at 10
19 (admitting that the spec discloses rotating "the housing (and thus the emitter and APD pairs) about
20 the base at the same speed."). A device which rotates the emitters and detectors separate from their
21 support structure is disclosed nowhere in the '558 patent, and would render the entire rotary
22 component term in claim 1 indefinite and lacking a written description.

23 Finally, Velodyne makes the nonsensical argument that the term "back and forth" in
24 Quanergy's construction is unnecessary because a device covered by claim 1 could be broader if it
25 rotates for 360 degrees, but only rotates for at least 200 RPM for a portion of that rotation. DI 68, at
26 10 (citing portions of testimony by Quanergy's expert). As an initial matter, the incomplete
27 hypothetical posed to Quanergy's expert did not ask whether rotation at 200 RPM for a portion of a
28 full 360 degree rotation would be understood by a POSITA to be within the claim language.

1 Quanergy's expert proposed a function (oscillating at 200 RPM) for claim 1 that would result in a
 2 broader claim 1 than claim 8, and found no structure for the recited function. Velodyne merely
 3 proposes another. If claim 1 is broader than claim 8 due to a warbling function, there is no warbling
 4 structure in the specification either.

5 **2. Quanergy's structure for performing the claimed functions is correct.**

6 The structures necessary for back and forth movement or oscillation and continuous rotation
 7 differ, particularly at rotation rates exceeding 200 RPM. Kamerman Decl. ¶ 38. As explained in
 8 the '558 patent, "[a] simple DC motor controller driving a high reliability brushed motor controls the
 9 rotation of the emitter/detectors." '558, 5:39-40. Other than a reference to a "spin motor" in Figure
 10 9A, the patent discloses no other structure configured to rotate the laser emitters and APDs. The
 11 inventor was aware of other types of motors. For example, the patent describes using brushless
 12 motors for steering and braking a vehicle. *Id.*, 5:57-58. The inventors chose not to disclose using
 13 brushless motors, or any other type of motors other than a high reliability brushed motor, for rotating
 14 the laser emitters and APDs, and is thus limited to the disclosed structure. *See Blackboard, Inc. v.*
 15 *Desire2Learn, Inc.*, 574 F.3d 1371, 1385 (Fed. Cir. 2009).

16 **a. Quanergy's construction is consistent with the intrinsic evidence.**

17 Given that the '558 patent discloses but one structure for the function of "rotating the support
 18 structure through a full 360 degree rotation at the rotation speed of at least 200 RPM," Quanergy's
 19 proposed construction is simply that—a DC motor controller driving a high reliability brushed
 20 motor. Consistent with the claims, this structure can be configured to rotate continuously at a speed
 21 of at least 200 RPM. Kamerman Decl. ¶¶ 37-38.

22 **b. Velodyne's proposed construction reads out much of the proposed**
 23 **structure.**

24 Velodyne's proposed structure reads out the required DC motor controller, and high-
 25 reliability and brushed characteristics of the disclosed structure, to instead encompass *all* motors and
 26 equivalents. The DC motor controller is required, because the motor must be able to be configured
 27 to perform the claimed at least 200 RPM rotation. Without the DC motor controller, there would be
 28 no way to set the speed of rotation to 200 RPM. The high-reliability and brushed characteristics are

1 required, as that covers the exact disclosed structure in the specification. *Id.* Expanding the
 2 corresponding structure in this way deviates from the trade-off required of a means-plus-function
 3 element. Functional claiming is permitted, but the claims are limited to the structures disclosed.

4 **c. The disclosed structure is insufficient to support the scope of the**
 5 **claim**

6 A DC motor controller driving a high reliability brushed motor is not capable of providing
 7 oscillatory motion for less than 360 degrees at a speed of at least 200 RPM. Kamerman Decl. ¶ 38.
 8 Instead, it requires a specialized structure, which is not disclosed in the specification. Kamerman
 9 Decl. ¶ 35-36 (explaining that he is aware of such structures). Dr. Glennie states that he is not even
 10 aware of such a device, certainly requiring that the structure be disclosed in the specification:

11 Q. The motor is oscillating the housing, attached to which are the laser
 12 emitters and APDs.

13 A: I am not aware of any systems that oscillate the laser emitters and APDs
 14 at a rate of 200 RPM or more.

15 Ex. 1, Glennie Tr. at 162:22-24. The patent does not disclose a structure corresponding to the
 16 function of rotating the plurality of laser emitters and the plurality of avalanche photodiode detectors
 17 at a speed of at least 200 RPM back and forth for less than 360 degree rotation. Thus, the claim is
 18 invalid. *See Liebel-Flarsheim Co. v. Medrad Inc.*, 358 F.3d 898, 911, 914 (Fed. Cir. 2004).

19 **C. “A Plurality of Laser Emitters” (Claims 1 and 19) (Term 4)**

20 Both independent claims of the '558 patent recite “a plurality of laser emitters.” The '558
 21 patent specification describes the term “emitters” to encompass two embodiments. The first
 22 embodiment requires that each laser “emitter” is a physical laser diodes. *See* '558, 4:59-63. The
 23 second embodiment describes “emitters” as using a laser from a single laser source that is, in turn,
 24 divided to generate multiple emitted laser beams. ('558, 5:1-4.) In this second embodiment, each
 25 smaller laser beam subdivided from the beam emitted from the laser light source, is an emitter. A
 26 POSITA would understand that the claimed emitters encompass both embodiments. Kamerman
 27 Decl. ¶¶ 52-55. The summary of the invention, file history, and dependent claims also confirm the
 28 patentee’s intent to capture the second preferred embodiment. Kamerman Decl. ¶¶ 57-64. Thus, the

claim term must be construed to encompass both embodiments, especially where the intrinsic evidence makes clear that both embodiments encompass the claimed “emitters.” *Verizon Services Corp. v. Vonage Holdings Corp.*, 503 F.3d 1295, (Fed. Cir. 2007) (“We normally do not interpret claim terms in a way that excludes disclosed examples in the specification.”); *MBO Labs., Inc. v. Becton, Dickinson & Co.*, 474 F.3d 1323, 1333 (Fed. Cir. 2007) (“[A] claim interpretation that excludes a preferred embodiment from the scope of the claim is rarely, if ever, correct.”) (internal citation omitted). Quanergy’s proposed construction correctly captures the intended claim scope.

Velodyne argues that this term should be construed as “two or more laser emitters,” ignoring the second disclosed preferred embodiment for “emitters”, and merely providing an unnecessary dictionary definition of the word “plurality.” Its construction would exclude the second emitter embodiment from the scope of the claims, which is rarely, if ever, correct. *See Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1583-84 (Fed. Cir. 1996). Velodyne argues that Quanergy’s proposed construction seeks to “ensnare mirrors, prisms, or other devices that split a laser beam.” DI 68 at 13. Better said, Velodyne’s construction inappropriately seeks to disclaim mirror, prisms and other devices that split laser beams notwithstanding that its own patent specification emphasizes that such devices are indeed within the scope of the invention. *See* ’558, 3:22-24, 5:1-4.

D. The Rotary Power Coupling Term (Claim 2) (Term 5)

1. Term 5 is governed by 35 U.S.C. Section 112, Para. 6 (pre-AIA).

Term 5 recites a function without reciting a structure for performing that function. It is thus a means-plus-function term governed by 35 U.S.C. 112 ¶ 6. *See Lockheed Martin Corp. v. Space Systems/Loral, Inc.*, 324 F.3d 1308, 1318 (Fed. Cir. 2003).

A “coupling” is defined in the art as a “device which serves to join, link, or allow the transfer of energy.” Kamerman Ex. B at 151. It is also defined as “[a]ny means whereby power can be transferred from one circuit to another.” Kamerman Ex. D at 71. Another definition is “[a] mutual relation between two circuits that permits energy transfer from one to another, through a wire, resistor, transformer, capacitor, or other device.” Kamerman Ex. E at 124. Common across these definitions is the reference to the function performed, and reference to “means” or the related nonce-word “device.” A POSITA would not understand the rotary power coupling limitation to connote

1 structure. Kamerman Decl. ¶ 46. The additional terms “rotary” and “power” do not provide any
 2 further insight into the structure. Instead, they further delineate the function, by requiring the means
 3 to allow for rotation and transmit power, respectively.

4 Velodyne argues that “rotary power coupling” connotes sufficiently definite structure. DI 68
 5 at 15-16. Velodyne, however, defines the structure by the function it performs: “a structural
 6 component that provides power to rotating laser emitter and detector circuits.” *Id.* at 14; *see also*
 7 Glennie Decl. ¶ 69 (defining rotary power couplings as “devices” that perform specified functions).
 8 In arguing that the term connotes sufficiently definite structure, Velodyne repeatedly uses the term
 9 “structural component,” “devices,” “means,” or other nonce-words, and then relies on the function
 10 being performed. In other words, Velodyne’s constructions of the term merely restate the structure
 11 and state that any “device” or “structure” that can perform that function is covered by the limitation.
 12 Thus, the claim limitation is equivalent to one that cites a coupling device or a coupling means. This
 13 substantiates that the limitation is a means-plus-function element, *i.e.* it “recites a function to be
 14 performed rather than definite structure or materials for performing that function.” *See Lockheed*
 15 *Martin*, 324 F.3d at 1318. When asked what devices would be excluded from this definition, Dr.
 16 Glennie could only exclude certain structures based on their ability or inability to perform the *recited*
 17 *function*, indicating again that the claimed rotary power coupling is merely a functional limitation:

18 Q. Is any device that provides power to a rotating structure a rotary power
 19 coupling?

20 A. No. I don’t believe so.

21 Q. What particular devices are excluded?

22 A. The coupling needs to allow rotation of one of the ends over the other.
 23 So if you just tried to, for example, connect with a wire, ***that would not be***
a rotary power coupling because it does not allow rotation.

24 Ex. 1, Glennie Tr. at 168:23-169:8 (emphasis added). Similarly, when pressed for a definition of
 25 rotary power coupling, Dr. Glennie again relied on the recited function:

26 Q. So how do you know whether or not, in the laundry list of items that
 27 you’ve include in Paragraph 69, whether you’re transmitting just power,
 just signal, and whether there’s rotation?

28 A. Because in the term in the patent, it says, “rotary power coupling.”

1 Q. So which of the three is it doing? Is it transmitting power? Signal?
2 Rotation? All of the above? A combination of the above?

3 A. It's rotating and transmitting power.

4 *Id.* at 171:22-172:6. This consistent return to the recited function clearly shows that this limitation
5 cannot be construed as a structure, and should be construed as a means-plus-function term.

6 **2. The function is clearly recited by the claim.**

7 The function of this means-plus-function element is “providing power from an external
8 source to the plurality of laser emitters and the plurality of avalanche photodiode detectors,” as
9 recited by the claim. The claimed laser emitters and APDs are rotated by the rotary component.
10 Providing power to these rotating laser emitters and APDs from an external source must be done in a
11 manner that allows for rotation.

12 **3. A single disclosed structure is disclosed in the specification**

13 The patent discloses only a single structure for performing the disclosed function – a
14 Mercotac Model 305. '558, 6:51-53. The Mercotac Model 305 is a commercially-available
15 electrical connector with three conductors, relying on a liquid metal for the electrical connection.
16 Kamerman Ex. F; deposition exhibit re liquid metal. The liquid metal conduction feature solves the
17 problem raised by Dr. Glennie, namely, that a wire (another physical electrical connection) would
18 not be a satisfactory rotary power coupling because it does not allow rotation. Ex. 1, Glennie Tr.
19 169:4-8. Consistent with the features of the Mercotac Model 305, as evidenced by publicly-
20 available information, Quanergy proposes that the corresponding structure be defined as “a three-
21 conductor rotary electrical connector with a liquid metal conductor and equivalents.” This properly
22 limits the scope of the patent to the structures and equivalents disclosed by the patentee for
23 performing the claimed function. *Blackboard*, 574 F.3d at 1385.

24 **E. “The Plurality of Photon Detectors” (claim 3) (Term 6)**

25 Claim 3 recites, “each one of the plurality of laser emitters is paired with a separate one of
26 the plurality of *photon detectors*.” (emphasis added). “[T]he plurality of photon detectors,” is
27 indefinite, because the scope of the claim cannot be reasonably ascertained by a POSITA. *See*
28

1 Kamerman Decl. ¶¶ 67-71. The term in claim 3 lacks an antecedent basis to provide the scope of the
 2 “plurality of photon detectors.” Claim 3 further recites that this “form[s] a plurality of pairs of laser
 3 emitters and avalanche photodiode detectors,” as opposed to a plurality of pairs of laser emitters and
 4 photon detectors. *Id.*

5 Velodyne argues that the claim equates avalanche photodiode detectors with photon detectors
 6 in light of the claim language and file history. DI 68 at 17-18. This intrinsic evidence, however,
 7 does not support Velodyne’s position. The claim language requires both avalanche photodiode
 8 detectors and photon detectors. In addition, the file history indicates that Velodyne had broader
 9 claims and then narrowed many of the claim terms. Velodyne did not, however, narrow the first
 10 “photon detector” term in claim 3. Thus, the claim appears to seek a broader scope than claim 1,
 11 claiming that the emitters may be paired with any of the plurality of photon detectors. See
 12 Kamerman Decl. ¶¶ 67-71. The inconsistent recitation of “the plurality of photon detectors” and the
 13 lack of antecedent basis for the term renders claim 3 indefinite to a POSTIA. *Id.*

14 Velodyne, by contrast, would construe “the plurality of photon detectors” as “the plurality of
 15 avalanche photodiode detectors,” alleging that the inconsistency is a drafting error. (DI 68, at 18.) It
 16 is improper for a court to correct errors in claims when the error, as here, is not indisputably clear
 17 that it was a drafting error. *See Novo Industries, L.P. v. Micro Molds Corp.*, 350 F.3d 1348, 1355–
 18 56, (Fed. Cir. 2003). Velodyne’s hyperbolic statements reinforces the fact that this term simply
 19 lacks a clear antecedent basis given the intrinsic evidence and expert testimony. The one case
 20 Velodyne cites is inapposite, as there, the earlier limitation had the same breadth as the later
 21 limitation. *See Energizer Holdings, Inc. v. Int’l Trade Comm’n.*, 435 F.3d 1366, 1370 (Fed. Cir.
 22 2006) (cited by Velodyne, which found that “said zinc anode” could claim antecedent basis from an
 23 earlier claim term reciting “an anode gel comprised of zinc”). To the extent Velodyne is arguing that
 24 the Court should rewrite the claim as there would otherwise be an absurd result, Courts should “not
 25 redraft claims to contradict their plain language in order to avoid a nonsensical result.” *Haemonetics*
 26 *Corp. v. Baxter Healthcare Corp.*, 607 F. 3d 776, 782 (Fed. Cir. 2010)

27 Velodyne’s recitation of “said plurality of photon detectors” also has a broader claim scope
 28 than what Velodyne now urges the Court to adopt, thus admitting that since the grant of the ‘558

1 patent, Velodyne has been claiming broader scope that it was entitled. (DI 68, at 18) Although
 2 Velodyne may now admit that this was a drafting error, the public is entitled to know the appropriate
 3 scope of a claim. *Hoganas AB v. Dresser Indus., Inc.*, 9 F.3d 948, 951 (Fed.Cir.1993) ("It would not
 4 be appropriate for us now to interpret the claim differently just to cure a drafting error.... That would
 5 unduly interfere with the function of claims in putting competitors on notice of the scope of the
 6 claimed invention.").

7 **F. "A communication component configured to allow transmission of signals**
 8 **generated by the avalanche photodiode detectors to an external component"**
 9 **(Claim 9) (Term 7).**

10 The parties agree that this term should be construed as a means-plus-function element under
 11 35 U.S.C. § 112 ¶ 6 (pre-AIA).⁶

12 **1. Quanergy's proposed function is supported by the claim language and**
 13 **resolves any ambiguity.**

14 The function of the communication component is "allowing transmission of signals
 15 generated by the avalanche photodiode detectors to a component external to the system." This
 16 construction clarifies the meaning of "external," consistent with the specification. The abstract
 17 describes an embodiment that "includes a base, a housing, a plurality of photon transmitters and
 18 photon detectors contained within the housing, a rotary motor that rotates the housing about the base,
 19 and a communication component that allows transmission of signals generated by the photon
 20 detectors to external components." See abstract. In the context of that description, the "external
 21 components" are not merely "external" to the photon detectors, but "external" to each of the
 22 components. Quanergy's proposed construction is also consistent with the understanding of a
 23 POSITA, who would understand the motivations to directly transmit the signal generated by the
 24 APD to a component external to the system. Kamerman Decl. ¶ 77.

25 Velodyne proposes the function "allowing transmission of signals generated by the avalanche
 26 photodiode detectors to an external component." This construction falls prey to the ambiguity raised
 27 above. Velodyne's proposed function allows the component to be external to either the APD or the
 28 system as a whole. DI 68, at 19. But this reads out the term "external" from the claim language

⁶ Quanergy no longer asserts that this term renders the claim indefinite under 35 U.S.C. § 112 ¶ 2 (pre-AIA).

1 because *any* component is external to the APD, except for the APD itself. *See Pause Tech., LLC v.*
 2 *TiVo, Inc.*, 419 F.3d 1326, 1334 (Fed. Cir. 2005) (citing *Merck & Co. v. Teva Pharms. USA, Inc.*,
 3 395 F.3d 1364, 1372 (Fed. Cir. 2005)). If the term cannot be resolved as Quanergy proposes, then it
 4 is indefinite.

5 2. The specification discloses no structure corresponding to the claimed 6 function

7 No corresponding structure is disclosed for the function of “allowing transmission of signals
 8 generated by the avalanche photodiode detectors to a component external to the system.” The
 9 claimed APDs generate an analog electrical waveform, which is the “signal[] generated by the
 10 avalanche photodiode detector[.]” Kamerman Decl. ¶ 79. The patent does not disclose transmitting
 11 *this analog signal* to a component external to the system, instead the APD signal is transformed into
 12 “data in the form of range and intensity information” inside the system, and this data is in turn
 13 transmitted to external components. *See* ’558. 1:15-18, 4:34-36, 5:11-15; Kamerman Decl. ¶ 80.
 14 Mr. Kamerman’s declaration provides an annotated version of Figure 9A showing this progression.
 15 Kamerman Decl. ¶ 80. The components shown in the annotated version of Figure 9A modify and
 16 process the signal generated by the APD, such that the signal output from the DSP off of the rotating
 17 structure is no longer the signal generated by the APD, but rather an amplified, filtered, and digitized
 18 derivative signal, which is then processed by the DSP to generate range and intensity data. *Id.*

19 The claim requires transmission of *the signal* generated by the APD, not a subsequent
 20 representation of that signal.⁷ *See* Kamerman Decl. ¶ 81. For this reason, the structures identified
 21 by Velodyne do not correspond to the claimed function. Specifically, a POSITA would understand
 22 that the disclosed Ethernet output, rotary coupling device, and wireless communication device are
 23 used to transmit the range and intensity data, not the signals generated by the APDs. Kamerman
 24 Decl. ¶¶ 82-85 (explaining that each of these communications methods are not transmitting the
 25 signal generated by the APDs). Velodyne’s construction would lead to absurd results as the
 26 processing of a navigation system is also based on data that originated from the APDs, and would

27 ⁷ Velodyne alters the meaning of Mr. Kamerman’s testimony in support of its argument that a
 28 POSITA would not exclude converted analog signals. DI 68 at 21. Mr. Kamerman testified that the
 signal generated by the DSP is “based on the analog signal” generated by the APD, not that the DSP
 generated signal *is* a signal generated by the APD, as claimed. Ex. 5, Kamerman Dep. at 221:13-17.

thus also be communication of a signal generated by the APD. Quanergy’s construction is consistent with the description of the APD output, the claim language, and the understanding of a POSITA.

G. The Processor Claim Terms Are Indefinite (Terms 8-10).

Claims 16-18 and 23-25 recite “a processor in signal communication with the plurality of laser emitters,” configured to perform various functions.

1. Term 8 is indefinite.

The terms “emit pulses of a reduced power level,” “return signal,” and “threshold level” do not define the scope of the claim with reasonable certainty to a POSITA. Kamerman Decl. ¶¶ 101-103. The ambiguity of the term “threshold level” renders this claim indefinite because there is no indication of how to establish a threshold level. For example, it is unclear how the threshold level would account for varying environmental conditions, material reflectivity, object distances, or other circumstances. Kamerman Decl. ¶ 101. The ambiguity of the term “return signal” renders this claim indefinite because it is not clear to a POSITA how the return signal is measured. Kamerman Decl. ¶ 102. The return signal could be measured based on intensity, pulse width, or some combination of the two. It is unclear whether the claim covers some or all of these possibilities. The ambiguity of the term “emit pulses of a reduced power level” renders this claim indefinite because it is unclear to a POSITA how the emitted pulses are modified. Kamerman Decl. ¶ 103. For example, it is unclear to what extent the power of the emitted pulses is reduced, whether the claim would cover not emitting pulses, and how many of the subsequent pulses should be of reduced power.

These infirmities are compounded given the purpose of the claim. The claimed threshold is set on the basis of safety concerns, as suggested by Velodyne’s remarks in the January 31, 2011 Office Action Response. *See* Ex. 3, Office Action Response at 15. There is no disclosure of how the basic measures of laser exposure safety, e.g., maximum permissible exposure, are translated into appropriate threshold levels or power reductions. Kamerman Decl. ¶¶ 104-105. To the extent the term is not indefinite, no algorithm is disclosed for the claimed function, as described below.

2. The “processor” terms invoke §112 ¶ 6.

If a claim recites “function without reciting sufficient structure for performing that function” it may be construed as a means-plus-function term. *Williamson v. Citrix Online, LLC*, 792 F.3d 1339,

1 1349 (Fed. Cir. 2015). If a processor term requires performing a function other than a general
 2 function performed by processors, then an algorithm is required.⁸

3 Velodyne first argues that the claimed processor is not subject to §112 ¶ 6 by
 4 mischaracterizing Quanergy's expert's deposition testimony. DI 68 at 22. Mr. Kamerman's cited
 5 testimony did not state that a structure for a processor is well known, what a POSITA would
 6 understand such structure to be, or the relevant time period for such an understanding. Rather, Mr.
 7 Kamerman's testimony was that the term "processor" is just a generic description for an undefined
 8 combination of software or hardware that performs the function of controlling the emissions of the
 9 laser emitters." Kamerman Decl., ¶¶ 111, 135. Such attempts to mischaracterize Mr. Kamerman's
 10 testimony appear to be a theme in Velodyne's opening brief, and should be disregarded.

11 Velodyne's argument that the claim language provides structure that describes how the
 12 processor interacts with other structural limitations is similarly unavailing. The claim language that
 13 the processor is in "signal communication" with other elements does not inform a POSITA as to the
 14 structure of the processor itself. Kamerman Decl., ¶¶ 112-113. Velodyne then points to the
 15 specification (DI 68 at 23), but nowhere does Velodyne allege that these disclosures limit what
 16 structure should be used for a processor. Instead, the claimed processor could be anything from
 17 transistor-transistor logic (TTL), to a general purpose processor. Kamerman Decl., ¶¶ 113-115.
 18 Finally, Velodyne claims that Quanergy's patent application supports its assertion that the processor
 19 is not subject to §112 ¶ 6. DI 68 at 23. That application, however, supports Quanergy's position
 20 that the processor could be anything from an ASIC, to being integrated into the pixels of a detector
 21 array. Kamerman Decl., ¶ 116. It is nonsensical that the claimed processor that is anything from a
 22 pixel in an array to a general purpose processor could connote sufficiently definite structure. Rather,
 23 the terms are limited to the disclosed structures for performing the claimed function. The only
 24

25 _____
 26 ⁸ See, e.g., *Velocity Patent LLC v. Mercedes-Benz USA*, No. 13-cv-8419, slip op. at 10-13 (N.D. Ill.
 27 Sept. 21, 2016) (holding that "a processor subsystem ... said processor subsystem determining is
 28 subject to §112 ¶ 6); *EON Corp. IP Holdings LLC v. AT&T Mobility LLC*, 785 F.3d 616, 623 (Fed.
 Cir. 2015) ("A microprocessor or general purpose computer lends sufficient structure only to basic
 functions of a microprocessor. All other computer-implemented functions require disclosure of an
 algorithm.").

disclosed hardware is a digital signal processor, which requires software to carry out any claimed function. *Id.*, ¶¶ 118-120.

3. The specification fails to disclose algorithms for performing the claimed functions.

The '558 specification fails to recite the required structure, because it fails to provide algorithms for the claimed digital signal processor.⁹ For example, for term 8 in Claims 16 and 23, the claim requires “emitting pulses of a reduced power level when at least one of the avalanche photodiode detectors detects a return signal above a threshold level.” The specification does not, however, disclose an algorithm for this outcome. *See* Kamerman Decl. ¶¶ 119-122. No disclosure addresses how to determine threshold level, how to measure return, or how to reduce power level of the subsequent emitted pulses. Kamerman Decl. ¶ 122. These answers are needed to provide an algorithm for the claimed function. *See id.*

Similarly, term 9(a) in Claims 17 and 24 does not disclose how the claimed invention determines that the rotary component is not rotating. Kamerman Decl. ¶¶ 126-127, 135-138. Nor does it explain how the laser emitters are prevented from firing. *Id.* Instead, it merely states: “Software and physical failsafes ensure that no firing takes place until the system is rotating at a minimum RPM.” '558, 5:42-44. Because the algorithm is undisclosed, the claim is indefinite. *See* Kamerman Decl. ¶¶ 125-138. Term 9(b) in claim 18, likewise, has an undisclosed algorithm, because the patent does not disclose how the claimed invention determines the threshold level, or how to determine that the rotary component is rotating below a threshold level. Kamerman Decl. ¶¶ 135-138. Nor does it explain how the laser emitters are prevented from firing. *Id.* Thus, the term is indefinite. *See* Kamerman Decl. ¶¶ 125-138. Finally, term 10 in claim 25 is the converse of the limitation recited in claim 18, *i.e.*, it requires a processor configured to allow the laser emitters to fire only when the rotary component is rotating below a threshold level. *See id.* ¶¶ 140. Claim 25 relies on similar claim language and the same disclosure as claim 18, and therefore suffers from the same indefiniteness and lack of corresponding structure as claim 18. *See id.* ¶¶ 139-147.

⁹ *See WMS Gaming, Inc. v. Int'l Game Tech.*, 184 F.3d 1339, 1348 (Fed. Cir. 1999) (requiring an algorithm where the claimed structure is a processor); *In re Katz Interactive Call Processing Patent Litigation*, 639 F.3d 1303, 1315 (Fed. Cir. 2011) (same).

1 Dated: July 24, 2017

COOLEY LLP

2
3 /s/ Erik B. Milch

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5 _____
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7 Quanergy Systems, Inc.
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